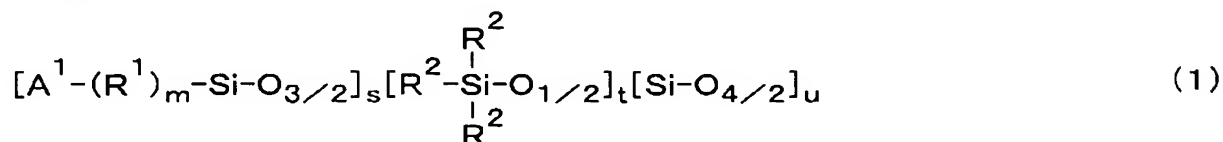


# CLAIMS

1. An alkali-soluble silicon-containing polymer which is represented by the general formula (1) below and has a weight-average molecular weight in the range from 500 to 500,000:



(In the formula,  $A^1$  is a phenyl group having either a hydroxyl group or an alkoxy group;  $R^1$  is an alkylene group of 1-4 carbons;  $m$  is 0 or 1;  $R^2$  is an alkyl group of 1-4 carbons ( $R^2$  in one molecule may be the same type or a combination of two or more different types.); each of  $s$  and  $u$  is a positive number;  $t$  is 0 or a positive number;  $0 \leq t/(s + u) \leq 1$ ; and  $0 < u/s \leq 5$ ).

2. The alkali-soluble silicon-containing polymer according to Claim 1, wherein  $0 \leq t/(s + u) \leq 0.2$  and  $0.2 < u/s \leq 5$  are in the general formula (1) and said polymer is solid at room temperature.

3. A method for manufacturing the alkali-soluble silicon-containing polymer represented by the general formula (1) above, being characterized in performing hydrolytic co-condensation of  $s$  moles of an organosilane having a hydrolysable group represented by the general formula (2) below,  $t$  moles of an organosilane having a hydrolysable group represented by the general formula (3) below, and  $u$  moles of a silicon compound having a hydrolysable group represented by the general formula (4) below (wherein  $s$  and  $u$  are positive numbers;  $t$  is 0 or a positive number;  $0 \leq t/(s + u) \leq 1$ ; and  $0 < u/s \leq 5$ ).



(In the formula,  $A^1$  is a phenyl group having either a hydroxyl group or an alkoxy group;  $R^1$  is an alkylene group of 1-4 carbons;  $M^1$  is a hydrolysable group; and  $m$  is 0 or 1.)

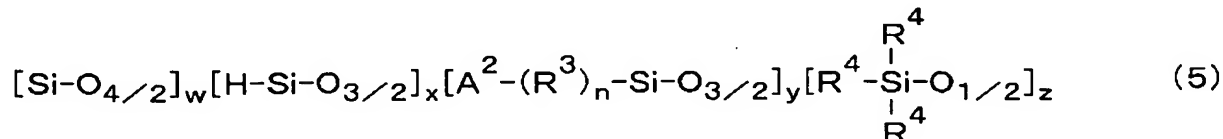


(In the formula,  $R^2$  is an alkyl group of 1-4 carbons; and  $M^2$  is a hydrolysable group.)



(In the formula,  $M^3$  is a hydrolysable group.)

4. A silicon-containing polymer which is represented by the general formula (5) below and has a weight-average molecular weight in the range from 500 to 500,000:



(In the formula,  $A^2$  is an organic group of 2-10 carbons, having a carbon-carbon unsaturated group;  $R^3$  is an alkylene group of 1-20 carbons, a bivalent aromatic group of 6-20 carbons, or a bivalent alicyclic group of 3-20 carbons;  $n$  is 0 or 1;  $R^4$  is a hydrogen atom or an alkyl group of 1-10 carbons ( $R^4$  in one molecule may be the same type or a combination of two or more different types.); each of  $x$  and  $y$  is a positive number; each of  $w$  and  $z$  is 0 or a positive number;  $0 \leq z/(w + x + y) \leq 2$ ; and  $0.01 \leq y/(w + x) \leq 5$ ).

5. A heat-resistant resin composition comprising a hydrosilylated polymer obtained by a reaction between a hydrogen atom bonded to a silicon atom in the silicon-containing polymer according to Claim 4, and a carbon-carbon unsaturated group in another silicon-containing polymer according to Claim 4.

6. The heat-resistant resin composition according to Claim 5, having a weight loss rate of 5% or less when heated from 25°C to 1,000°C at a rate of temperature increase of 10°C/minute in nitrogen atmosphere.

7. A heat-resistant film, which is obtained by spreading an organic solvent solution of the silicon-containing polymer according to Claim 4 on a substrate and curing the coated film by thermal hydrosilylation.